

CLAIMS

What is claimed is:

1. A composition of matter, comprising:
a polymer matrix comprising polymer chains having a plurality of carbon-
5 fluorine bonds; and
a plurality of quantum dots distributed within the polymer matrix.
2. The composition of matter of claim 1, wherein the quantum dots comprise at least one organic cap compound comprising at least one aromatic group.
3. The composition of matter of claim 1, wherein the polymer matrix comprises a
10 perfluorocyclobutane polymer.
4. The composition of matter of claim 1, wherein each polymer chain comprises at least 10 repeat units and (b) is cross linked at least twice to at least one of the other polymer chains.
5. The composition of matter of claim 1, wherein the polymer chains comprise aromatic
15 groups.
6. The composition of matter of claim 1, wherein the quantum dots comprise at least one organic cap compound and neither the quantum dots nor the cap compounds of the quantum dots are covalently bound to the polymer matrix.
7. The composition of matter of claim 1, wherein the polymer matrix comprises a
20 number N^A aliphatic carbon-hydrogen bonds and a number N^T total bonds, the ratio N^A/N^T being less than about 0.3.
8. An optical waveguide comprising the composition of matter of claim 1.
9. An optical waveguide, comprising:
an optical core comprising:
25 a polymer matrix comprising polymer chains having a plurality of carbon-fluorine bonds; and
a plurality of quantum dots distributed within the polymer matrix of the optical core.

10. The optical waveguide of claim 9, wherein the waveguide is a one-dimensional waveguide.
11. The optical waveguide of claim 15, wherein the quantum dots are capable of absorbing energy and emitting photoluminescence.
- 5 12. The optical waveguide of claim 9, wherein the quantum dots comprise at least one organic cap compound comprising at least one aromatic group.
13. The optical waveguide of claim 9, wherein the polymer comprises a number N^A aliphatic carbon-hydrogen bonds and a number N^T total bonds, the ratio N^A/N^T being less than about 0.3.
- 10 14. The optical waveguide of claim 9, wherein the polymer chains comprise aromatic groups.
15. A method of preparing an optical waveguide, comprising:
combining a polymerizable resin and a plurality of quantum dots to prepare a mixture, the polymerizable resin comprising molecules having a plurality of carbon-fluorine
15 bonds; and
initiating polymerization of the polymerizable resin.
16. The method of claim 15, wherein the polymerizable resin includes at least one of a monomer and an oligomer, the at least one of a monomer and an oligomer comprising a plurality of aromatic groups.
- 20 17. The method of claim 15, wherein, upon polymerization, the polymerizable resin forms a polyfluorocyclobutane polymer.
18. The method of claim 15, wherein the quantum dots comprise at least one organic cap comprising at least one aromatic group.
19. The method of claim 15, wherein the polymerizable resin comprises a number N^A
25 aliphatic carbon-hydrogen bonds and a number N^T total bonds, the ratio N^A/N^T being less than about 0.3.
20. The method of claim 15, comprising coating a surface with the mixture.